DEPARTMENT OF MINES AND RESOURCES

BUREAU OF MINES

CANADA

Ottawa, July 16, 1946.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2077.

Concentration Tests on a Lead-Zinc Ore from Montbeillard Township, Rouyn Area, Quebec.

==========

Note:
This report relates essentially to the samples as received. It shall not, nor any correspondence connected therewith, be used in part or in full as publicity or advertising matter for the sale of shares in any promotion.

(Copy No. 7.)

BUREAU OF MINES
DIVISION OF METALLIC MINERALS
ORE DRESSING AND
METALLURGICAL LABORATORIES

CANADA
DEPARTMENT
OF
MINES AND RESOURCES
MINES AND GEOLOGY BRANCH

O T T A W A July 16, 1946.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2077.

Concentration Tests on a Lead-Zinc Ore from Montbeillard Township, Rouyn Area, Quebec.

==========

Shipment:

A shipment of 2,070 pounds (25 bags) of lead-zinc sulphide ore was received at these Laboratories on June 5, 1946, having been submitted by Douglas S. Baird, President, Quebec Precambrian Corporation, Box 870, Rouyn, Quebec.

A covering letter stated that the sample was taken from the dump of an open cut along the orebody in ranges IX and X, Montbeillard township, in the Rouyn Noranda district of northwestern Quebec.

Object of Investigation:

The ore was submitted for concentration tests to obtain both a lead and a zinc concentrate.

Results of Investigation:

A high-grade lead concentrate analysing relatively high in zinc and a zinc concentrate of satisfactory grade were obtained.

Characteristics of the Ore:

Head Sample Analysis:

Lead	-	5.10 per cent
Zinc	-	28.05 "
Copper	-	0.093 "
Iron	-	2.98 "
Insol.	-	46.13 "
Gold	-	Trace
Silver	-	0.91 oz./ton

Macroscopically the ore was a very high grade zinc ore, with some lead, in a quartz gangue. The lead and zinc were present as the sulphides galena and sphalerite. Minor amounts of copper (chalcopyrite) and iron (pyrite) were noted.

Microscopic examination disclosed the following information:

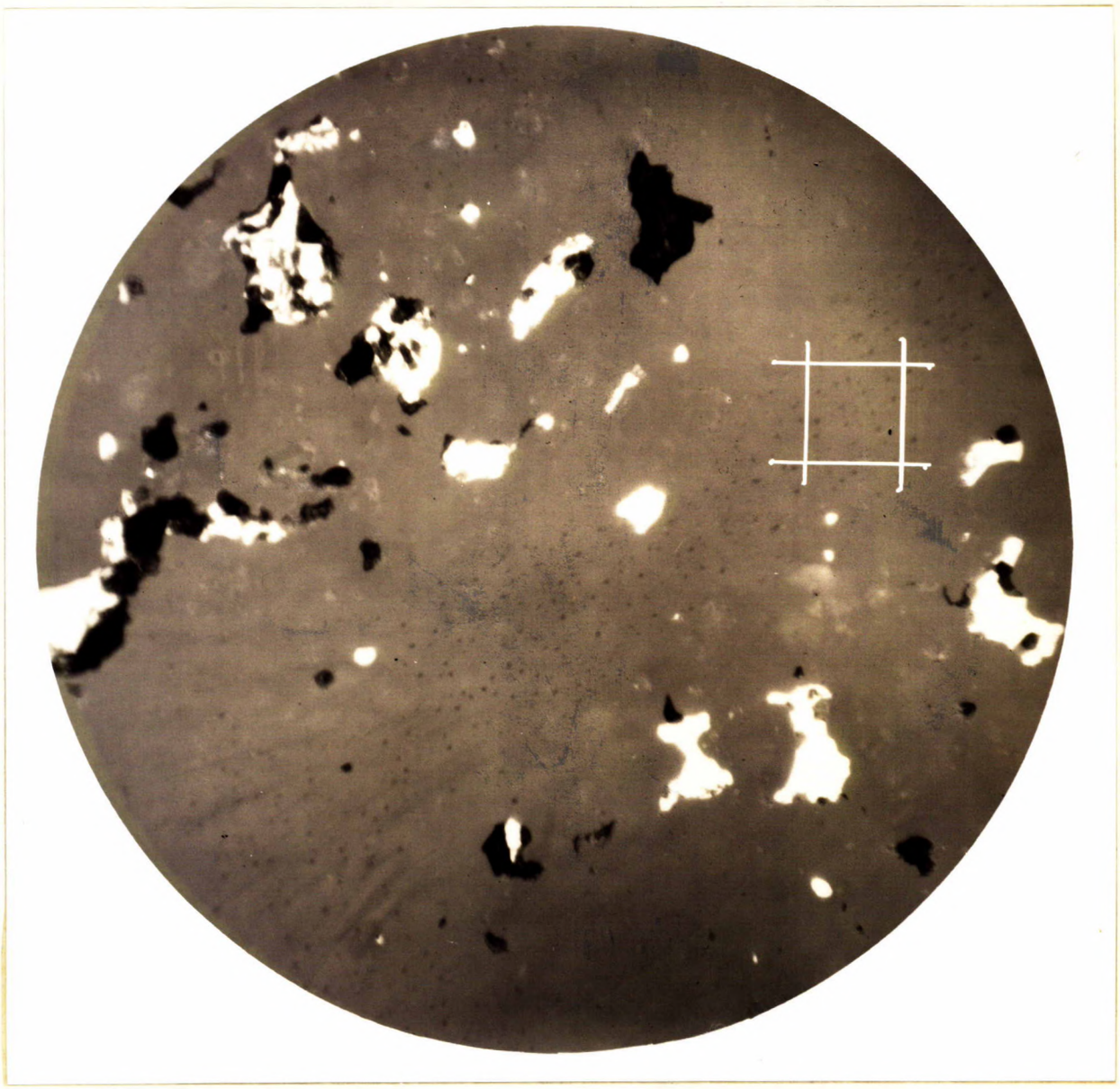
The sphalerite is largely massive but also occurs in the gangue as disseminated grains ranging down to very fine sizes (see Figure 1). It contains numerous inclusions of gaugue and of other sulphides (see Figure 2). Galena occurs in gangue and in the sphalerite (see Figure 2) as coarse to fine, irregular grains and small masses.

Chalcopyrite has the same modes of occurrence as galena, with which it is often associated. When it occurs in sphalerite, however, it is visible in much finer sizes than when found in the galena.

(Figures 1 and 2 follow,)
(on Pages 3 and 4.)

(Characteristics of the Ore, cont'd) -

Figure 1.



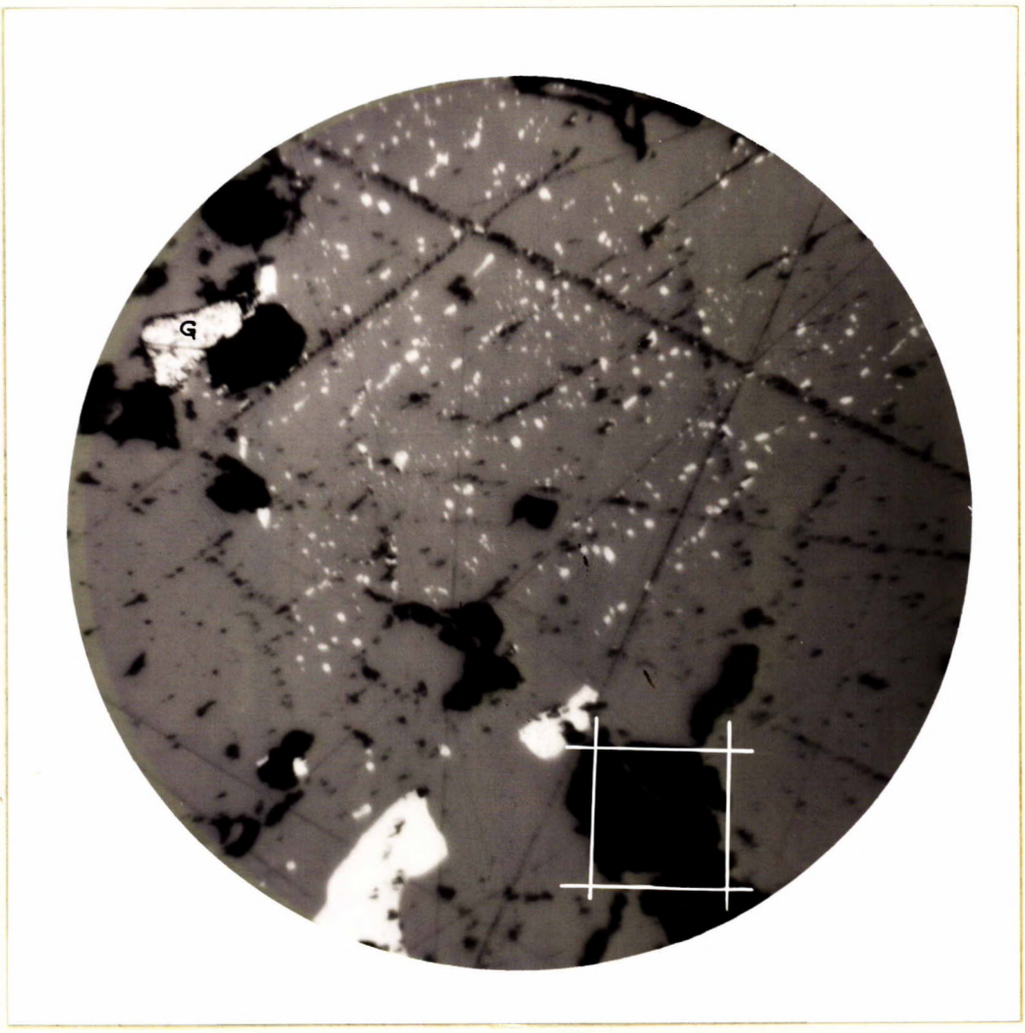
SPHALERITE (WHITE) DISSEMINATED THROUGH GANGUE (GREY).

Note that the particles of zinc sulphide range down to very fine sizes. Pits are black, and a 200-mesh Tyler screen opening is superimposed.
Magnification, X200.

-

(Characteristics of the Ore, cont'd) -

Figure 2.



PHOTOMICROGRAPH OF A POLISHED SECTION SHOWING A SWARM OF TINY INCLUSIONS OF CHALCOPYRITE (WHITE) AND ONE GRAIN OF GALENA (G) IN SPHALERITE (GREY).

Pits and scratches are black, and a 200-mesh Tyler screen opening is outlined in white.
Magnification, X250.

DETAILS OF TEST WORK:

The ore, with reagents to depress the zinc, was ground to approximately 70 per cent minus 200 mesh in an Abbé mill, transferred to a 2,000-gram flotation cell, conditioned, and a lead rougher, then a lead scavenger flotation concentrate, removed. The remaining pulp was further conditioned with lime and copper sulphate and then a zinc rougher concentrate and a zinc scavenger concentrate were removed. The lead rougher and zinc rougher concentrates were individually cleaned. The rougher concentrate assays, etc., are shown as calculated from the products resulting from the cleaning operations.

Table I shows the reagents used and their point of addition, while Table II shows the total reagent consumption for Tests Nos. 10 and 11. Tables III and IV detail the metallurgical results obtained on these two tests.

(Tables I to IV follow,
on Pages 6 and 7.)

(Details of Investigation, cont'd) -

TABLE I. - Points of Addition of Reagents, Tests Nos. 10 and 11.

Ball Mill:

(Test No. 10, 64% -200 mesh;)
(Test No. 11, 77% -200 mesh.)

	Test No. 10	Test No. 11
	- (Lb./ton feed) -	
Soda ash -	1.0	1.0
Zinc sulphate -	0.6	1.0
Sodium cyanide -	0.2	0.4
Sodium silicate -	1.0	1.5

Lead Conditioner:

(Test No. 10, pH 7.5)
(Test No. 11, pH 7.5)

Sodium ethyl xanthate -	0.07	0.05
Pine oil -	0.01	0.01
Cresylic acid -	0.02	0.02

Zinc Conditioner:

(Test No. 10, pH 10.2)
(Test No. 11, pH 10.3)

Lime -	2.0	2.0
Copper sulphate -	1.0	1.5
Sodium ethyl xanthate -	0.1	0.15

Zinc Scavenger Circuit:

Copper sulphate -	1.0	0.5
Sodium ethyl xanthate -	0.1	0.1
Pine oil -	0.01	0.01
Cresylic acid -	0.02	0.02

Lead Cleaner Circuit:

Zinc sulphate -	0.2	0.4
Sodium cyanide -	0.05	0.2

Zinc Cleaner Circuit:

Lime -	0.5	0.5

TABLE II. - Total Reagent Consumption.

	Test No. 10	Test No. 11
	- (Lb./ton feed) -	
Soda ash -	1.0	1.0
Zinc sulphate -	0.8	1.4
Sodium cyanide -	0.25	0.6
Sodium silicate -	1.0	1.5
Sodium ethyl xanthate -	0.27	0.3
Pine oil -	0.02	0.02
Cresylic acid -	0.04	0.04
Lime -	2.5	2.5
Copper sulphate -	2.0	2.0

(Details of Test Work, cont'd) -

TABLE III. - Metallurgical Results, Test No. 10.

Product	Weight		Analysis, per cent		Content, grams		Distribution, per cent	
	Grams	Per cent	Pb	Zn	Pb	Zn	Pb	Zn
Head (calc.)	2,002.4	100.0	4.86	30.03	97.23	601.35	100.00	100.00
Lead cleaner conc.	70.8	3.5	72.00	7.98	50.98	5.65	52.44	0.94
Lead middling	40.5	2.0	52.80	15.86	21.38	6.42	21.99	1.07
Lead rougher conc. (calc.)	111.3	5.5	65.01	10.84	72.36	12.07	74.43	2.01
Lead scavenger conc.	72.5	3.6	19.70	37.23	14.28	26.99	14.67	4.49
Zinc cleaner conc.	408.0	20.4	0.60	63.04	2.45	257.20	2.52	42.77
Zinc middling	484.0	24.2	0.65	58.25	3.15	281.93	3.24	46.88
Zinc rougher conc. (calc.)	892.0	44.6	0.63	60.44	5.60	539.13	5.76	89.65
Zinc scavenger conc.	68.7	3.4	2.90	18.23	1.99	12.52	2.05	2.08
Flot. tailing	857.9	42.8	0.35	1.24	3.00	10.64	3.09	1.77

TABLE IV. - Metallurgical Results, Test No. 11.

Product	Weight		Analysis, per cent		Content, grams		Distribution, per cent	
	Grams	Per cent	Pb	Zn	Pb	Zn	Pb	Zn
Head (calc.)	1,997.7	100.0	5.08	29.39	101.43	587.16	100.00	100.00
Lead cleaner conc.	102.0	5.1	69.12	9.80	70.50	10.00	69.51	1.70
Lead middling	47.2	2.3	24.99	33.26	11.80	15.70	11.63	2.67
Lead rougher conc. (calc.)	149.2	7.4	55.16	17.23	82.30	25.70	81.14	4.37
Lead scavenger conc.	63.5	3.2	13.82	37.47	8.78	23.79	8.66	4.05
Zinc cleaner conc.	591.0	29.6	0.38	61.08	2.24	360.98	2.21	61.48
Zinc middling	230.5	11.5	0.77	52.17	1.77	120.25	1.74	20.48
Zinc rougher conc. (calc.)	821.5	41.1	0.49	58.58	4.01	481.23	3.95	81.96
Zinc scavenger conc.	125.0	6.3	2.12	31.87	2.65	39.84	2.61	6.79
Flot. tailing	838.5	42.0	0.44	1.98	3.69	16.60	3.64	2.83

Conclusions:

1. Lead Concentrate. There should be no difficulty in obtaining a lead concentrate from this ore which will analyse 70 per cent lead and 6 to 8 per cent zinc, with a recovery of 75 to 85 per cent of the available lead. Most of the copper, gold and silver contained in the ore will report in the lead concentrate. The iron should analyse 2 to 3 per cent and the insoluble approximately 1 per cent in this product.

2. Zinc Concentrate. No difficulty should be experienced in obtaining a zinc concentrate containing 85 to 90 per cent of the available zinc and analysing 60 per cent zinc and 0.5 per cent lead. The copper, gold and silver contents of the zinc concentrate will be very low. The iron should analyse 3.5 per cent to 4 per cent and the insoluble approximately 4 per cent.

3. The high zinc content of the ore, together with the copper present, tends towards a high zinc analysis in the lead concentrate. To reduce this zinc content to less than 5 per cent will result in low recoveries of lead and high consumption of zinc sulphate and sodium cyanide.

Recommendations:

1. Treatment of the ore, as submitted, would call for two general flotation circuits, one for lead and one for zinc, each as follows:

(a) Removal of a rougher concentrate.

(b) Removal of a scavenger concentrate.

(c) Cleaning of the rougher concentrate.

(d) Cleaning of the combined scavenger concentrate and cleaner circuit tailings (middlings) with the tailings from this circuit returning to the scavenger circuit.

(Continued on next page)

(Recommendations, cont'd) -

2. The results obtained have reference only to the high-grade zinc sample submitted. Run-of-mine ore would almost certainly be considerably lower in grade than the sample tested, and it is suggested that when an orebody has been blocked out a second sample, representative of the expected mill feed, be submitted for testing.

oooooooo
oooooooo
oo

ELC:CG